

REMARKS

Claims 1-9 and 22 are pending in the present application. By this Amendment, claims 3 and 22 are cancelled without prejudice or disclaimer, and claims 1, 6 and 8 are amended. The amendments are solely for the purposes of clarity and precision, and to incorporate the subject matter of dependent claims 3 and 22 into independent claims 1 and 6, respectively.

Also, Applicant thanks the Examiner for withdrawing the previous grounds of rejection under 35 U.S.C. § 112, 102 and 103. For at least the reasons herein, Applicant respectfully requests withdrawal of the rejections, and allowance of the claims.

I. Claims 6 and 8 are in proper condition

Claims 6 and 8 stand rejected under 35 U.S.C. § 112, 2nd paragraph due to alleged indefiniteness. As shown in the foregoing amendment, Applicant has amended the claims to overcome this rejections. Accordingly, Applicant respectfully requests withdrawal of the rejection under 35 U.S.C. § 112, 2nd paragraph.

II. The claims are novel

Claims 6, 8 and 22 stand rejected due to alleged anticipation under 35 U.S.C. § 102(b) over Kawata et al. (U.S. Patent No. 5,890,395, hereafter "Kawata"). Applicant respectfully submits that Kawata fails to disclose all of the claimed combinations of features, as required for an anticipation rejection under § 102. Thus, Applicant respectfully requests withdrawal of the rejection, and allowance of the claims.

Applicant respectfully submits that Kawata fails to disclose that the sectional geometry of said projection is selected from a group consisting of triangle, trapezoid, curved object with a round top and a slope, and semi-sphere, as recited in independent claim 6. Applicant respectfully

submits that the shapes recited in claim 6 are distinguishable from the disclosed rectangular shape of Kawata. Thus, Applicant respectfully requests withdrawal of the rejection of independent claim 6.

Claim 8 depends from independent claim 6. Applicant respectfully submits that claim 8 is allowable for at least the same reasons as discussed above with respect to independent claim 6. Applicant also notes that the Examiner has not provided a basis for rejecting claim 22. As shown in the foregoing amendments, claim 22 has been cancelled and its rejection is thus rendered moot. However, the subject matter of former claim 22 has been incorporated into independent claim 6, from which it had depended. As discussed above, claim 6 is not believed to be anticipated by Kawata.

Therefore, Applicant respectfully requests withdrawal of the rejections under § 102, and allowance of the claims.

III. The claims would not have been obvious

Claims 1, 2, 4 and 5 stand rejected due to alleged obviousness under 35 U.S.C. § 103(a) over the Examiner's proposed combination of Bito et al. (U.S. Patent No. 5,983,055, hereafter "Bito") and Shintani et al. (U.S. Patent No. 5,124,219, hereafter "Shintani"), and claim 3 also stands rejected under § 103(a) over the proposed combination of Bito, Shintani and Nishimuro et al. (U.S. Patent No. 5,991,574, hereafter "Nishimuro"). Also, claim 9 stands rejected due to alleged obviousness over the Examiner's proposed combination of Kawata and Nishimuro.

The Examiner acknowledges that the proposed combination of references fails to disclose the water absorption and taper angle ranges recited in independent claim 1. However, the

Examiner asserts that it would be a matter of routine optimization to vary these values to arrive at the claimed values.

With respect to the claimed ranges and the cited art of record, Applicant notes that under MPEP § 21440.5, a obviousness rejection may be rebutted by showing the criticality of the claimed range. In other words, if one skilled in the art would not have been motivated to further optimize the cited art due to the criticality of the range (e.g., unexpected results within that range), the obviousness rejection is rebutting. Applicant refers the Examiner to *In re Woodruff*, 16 USPQ2d 1934 (Fed. Cir. 1990) for more details.

Additionally, the obviousness rejection may be rebutted by showing that the cited art teaches away from the claimed range. For additional details, Applicant refers the Examiner to *In re Geisler*, 43 USPQ 2d 1362 (Fed. Cir. 1997).

Even if there is an overlap in ranges, when the range of the reference is extremely broad compared to the claimed range, a situation exists analogous to obviousness of a species when a genus is disclosed. For further clarification, Applicant refers the Examiner to *In re Baird*, 21 USPQ2d 1941 (Fed. Cir. 1992).

Taper Range

Applicant respectfully submits that the claimed taper range is outside of the range disclosed in the cited art of record, and that due to the criticality of the claimed tapered range, one skilled in the art would not have been motivated to engage in routine optimization to achieve the claimed taper range.

Applicant respectfully submits that one skilled in the art would not have been motivated to engage in routine optimization with respect to the taper range. For example, but not by way of limitation, the taper angle range of Bito is 3.57×10^{-3} to 3.7×10^{-3} , and clearly falls outside of the claimed range. Further, there is no evidence that one skilled in the art would seek to apply anything other than the specific taper angle value applied in Bito. Additionally, while Shintani discloses a water absorption no higher than 10%, claim 1 recites a water absorption range of less than 0.3%.

Additionally, Applicant respectfully submits that the ranges for taper angle are critical, and one skilled in the art would not have been motivated to engage in routine optimization to arrive at this range, because the results would have been unexpected, based on the teachings of the cited prior art. More specifically, Applicant refers the Examiner to the paragraph bridging application pages 20-21, which further details why the claimed range is so critical. Applicant respectfully submits that these details are not disclosed in the cited art, and are only disclosed in the specification of the present application.

Because Bito is above this range, Applicant respectfully submits that the resin pipe of Bito is not uniform in physical properties, which adversely affects the electrical properties and dimensional accuracy of the resin pipe to be used as the base for the photosensitive drums. Thus, Applicant respectfully submits that the proposed combination of references fails to disclose or suggest the claimed range recited in independent claim 1.

Water Absorption Range

The Examiner asserts that “Shintani et al. fail to disclose a resin having a water absorption no higher than 0.3%. However, as stated above, Shintani et al. disclose a resin having a water absorption would be readily determined through routine optimization by one having ordinary skill in the art depending on the desired end use of the product. It therefore would be obvious for one of ordinary skill in the art to vary the water absorption, since the water absorption would be readily determined through optimization by one having ordinary skill in the art depending on the desired end result as shown by Shintani et al.”

In response to the foregoing assertion by the Examiner, Applicant respectfully submits that in the presently claimed invention, the resin used as a material of a resin pipe is an alloy resin being a blend of a polyamide resin with a resin having a water absorption no higher than 0.3%, and the polyamide resin is selected from a polyamide obtained from metaxylenediamine and adipic acid, and a polyamide resin obtained from E-caprolactam. The resin having a water absorption no higher than 10% disclosed by Shintani is a nylon copolymer having a water absorption of 1.5%, 2%, or 4% (Applicant refers the Examiner to Shintani, Table 1). That is, Shintani does not disclose or suggest a resin having a water absorption no higher than 0.3%.

In addition, Applicant notes that Shintani does not use of an alloy resin. With regard to the optimization of the water absorption stated by the Examiner, Applicant respectfully submits that it is very difficult to anticipate a water absorption of less than 0.3% from the description of Shintani. That is, Shintani does not teach or suggest a water absorption of less than 0.3%. Applicant refers the Examiner to column 3, lines 55-65 of Shintani. The lower limit of the water

absorption of nylon copolymers described in Shintani is 0.5%, which fails to reach the claimed upper limit of 0.3%. Thus, residual potential becomes high and fogs may appear on the ground if such a modification was made to the cited art of record. That is, Shintani does not recommend use of nylon copolymers having a water absorption of less than 0.5%. Thus, Shintani does not teach or suggest the claimed water absorption of less than 0.3%.

Bito discloses in column 27, lines 62-66 "The supporting body 2 is made of a mixture of a synthetic resin, a conductive material, a light absorbing material and a light scattering material. Examples of applicable synthetic resins include a polyacetal resin, polypropylene, polyethylene, polyvinyl chloride, polystyrene, an ABS resin, noryl, nylon, polycarbonate, polybutylene terephthalate and polyethylene fluoride, and a mixture thereof."

However, Applicant respectfully submits that it is difficult to read to select the combination of a nylon and a resin having a water absorption no higher than 0.3% from Bito. Furthermore, Bito does not disclose or suggest the claimed nylon that is selected from a polyamide obtained from metaxylylenediamine and adipic acid and/or a polyamide resin obtained from E-caprolactam.

The Examiner states that Nishimuro teaches the use of nylon 6 in the making of a resin pipe (column 2, lines 64-67; column 3, lines 1-8) for the purpose of making a photosensitive drum having enhanced reliability (column 1, lines 65-66; column 2, lines 1-3).

However, Applicant respectfully submits that Nishimuro fails to disclose and suggest that a polyamide resin is blended with a resin having a water absorption no higher than 0.3%. In Examples (Table 1) of Nishimuro et al., all Examples use nylon 66 and polyphenylene sulfide.

As described in the present specification, the blending resin used in the present invention has a low water absorption and is not substantially subject to dimensional change in a high-temperature, high-humidity environment. Nylon 65 has a value of about 0.6-3%, and nylon has a value of 0.7-1.8%.

Molded products with such a high water absorption may pose a problem with dimensional accuracy. That is, they expand due to water absorption when they are allowed to stand in a high-temperature high-humidity atmosphere greater than or equal to 30°C and greater than or equal to 90 % RH for 2 to 3 hours. Expansion may adversely affect the function of the photosensitive body and hence greatly aggravates the image quality. Since Nishimuro teaches the use of nylon 6 in a single as shown in its example, Applicant respectfully submits that Nishimuro would include the above-discussed faults. Thus, Nishimuro teaches away from the claimed alloy resin.

Claims 2, 4 and 5 depend from independent claim 1, and claims 7-9 depend from independent claim 6. Applicant respectfully submits that the dependent claims are allowable for at least the same reasons as the independent claims from which they depend. As shown in the foregoing amendments, claim 3 is cancelled and its subject matter has been incorporated into independent claim 1, thus rendering its rejection moot.

Therefore, Applicant respectfully requests withdrawal of the obviousness rejection, and allowance of the claims.

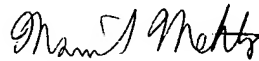
Amendment Under 37 C.F.R. § 1.116
U.S. Appln. No. 09/748,215

IV. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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APPENDIX
VERSION WITH MARKINGS TO SHOW CHANGES MADE

IN THE CLAIMS:

Claims 3 and 22 are canceled.

The claims are amended as follows:

1. (Twice amended) A resin pipe which is formed by injection molding from a resin or a resin compound, wherein said resin is an alloy resin of a blend of a polyamide resin with a resin having a water absorption no higher than 0.3%, said polyamide resin is selected from a polyamide obtained from metaxylylenediamine and adipic acid, and a polyamide resin obtained from ϵ -caprolactam, and said resin pipe has a tapered inner surface to facilitate demolding such that the taper angle (Θ) satisfies the following relationship:

$$0.5 \times 10^{-3} < \tan \Theta < 3.5 \times 10^{-3}.$$

6. (Twice amended) A resin pipe formed by injection molding from a thermoplastic resin or a resin compound based on a thermoplastic resin, said resin pipe [having]comprising:

an integrally molded projection that radially [protruding]protrudes outward from an opposite end of [its]an outer surface of the resin pipe to [one]an end of said resin pipe having a flange and a driving gear formed integrally therewith, wherein the sectional geometry of said projection is selected from a group consisting of triangle, trapezoid, curved object with a round top and a slope, and semi-sphere.

8. (Twice amended) The resin pipe as defined in Claim 6, which is a cylindrical base for [the]a photosensitive drum that is mounted in an electrophotographic apparatus or an electrostatic recording apparatus.